SHORT COMMUNICATION

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Gated blood pool SPECT improves reproducibility of right and left ventricular Fourier phase analysis in radionuclide angiography

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Objectives: The ventricular phase angle, a parametric method applied to Fourier phase analysis (FPA) in radionuclide ventriculography, allows the quantitative analysis of ventricular contractile synchrony. However, FPA reproducibility using gated blood pool SPECT (GBPS) has not been fully evaluated. The present study evaluates whether by using GBPS, the reproducibility of FPA could be improved over that in planar radionuclide angiography (PRNA). ***Methods:*** Forty-three subjects underwent both GBPS and PRNA, of which 10 subjects were normal controls, 25 had dilated cardiomyopathy, and 8 had various heart diseases. Interventricular contractile synchrony was measured as the absolute difference in RV and LV mean ventricular phase angle as deltaø (RV – LV). Intraventricular contractile synchrony was measured as the standard deviation of the mean phase angle for the RV and LV blood pools (RVSDø, LVSDø). Two nuclear physicians processed the same phase images of GBPS to evaluate the interobserver reproducibility of the phase angles using data from the 43 study participants. Phase images acquired from PRNA were processed in the same manner. ***Results:*** Excellent reproducibility of deltaø (RV – LV) was obtained with both GBPS ($Y = -3.10 + 0.89 \cdot X$; $r = 0.901$) and PRNA ($Y = -4.51 + 0.81 \cdot X$; $r = 0.834$). In regard to RVSDø reproducibility was not adequate with PRNA ($Y = 18.56 + 0.35 \cdot X$; $r = 0.424$), while it was acceptable with GBPS ($Y = 5.22 + 0.85 \cdot X$; $r = 0.864$). LVSDø reproducibility was superior using both GBPS ($Y = 4.15 + 0.97 \cdot X$; $r = 0.965$) and PRNA ($Y = -0.55 + 0.98 \cdot X$; $r = 0.910$). ***Conclusion:*** Our results demonstrate FPA obtained using GBPS to be highly reproducible for evaluating deltaø (RV – LV), RVSDø and LVSDø, in comparison with the PRNA method. We thus consider GBPS appropriate for evaluating ventricular contractile synchrony.

Key words: Fourier phase analysis, reproducibility, blood pool scintigraphy